

Finding the **Folate** in Foods

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Leafy greens, dried beans and peas, fortified cereals and grain products, and some fruits and vegetables are rich sources of folate.

Nutrition scientists need sophisticated technologies to distinguish quantities of key nutrients in foods. Indeed, sound nutritional advice is based on good food analysis. Now, Agricultural Research Service scientists at the Food Composition Laboratory (FCL), in Beltsville, Maryland, have developed a new method to analyze the essential B vitamin folate in foods and in blood serum.

Folate piqued America's nutritional interest when the Food and Drug Administration in 1998 required that grain products be fortified with it. Evidence showed that risks of birth defects would drop if mothers-to-be took more folic acid.

Folate is important to white blood cell makeup and for regulation of the amino acid homocysteine. Folate is also involved

in nucleic acid synthesis and methylation reactions, both of which help the body form genetic material, or DNA.

"Dietary folate is important for all aspects of life—especially during growth," says Robert J. Pawlosky, the FCL chemist who first reported the new folate analysis method last year. "It also appears to be important for maintaining cardiovascular tone and preventing heart disease."

Folate is a generic term used for a family of related compounds that exhibit similar vitamin activity within the body. The family includes folic acid, which is the major synthetic form of folate used by food processors to fortify foods. Each is absorbed by the body at different rates.

The new method for analyzing the amount of folate in foods uses high-performance liquid chromatography and mass spectrometry, or HPLC-MS. Current methods do not test for individual folates separately. But, says Pawlosky, "With the combination of HPLC-MS and stable isotopes, we can detect and measure very low levels of specific folates." The lab is now perfecting yet another way to analyze folate—HPLC with fluorescence detection. It's a less expensive method, but one that will complement the HPLC-MS method.

Accuracy is important to experts who establish and reexamine the nationally recommended folate levels and who monitor the folate fortification program. For example, in 1989, the recommended dietary allowance was lowered from 400 micrograms (mcg) to 200 mcg for men and 180 mcg for women. Then, in 1998, dietary folate equivalents were established—because of differences in bioavailability, or absorption—of at least 400 mcg per day for adults.

The ARS researchers now have a memorandum of understanding with the Nutrition Institute at the University of Chile at Santiago. Together, they are testing food and blood samples to gauge levels of folate and folic acid. Chile's program is designed to compare the country's fortification program of foods with how much they find in the Chilean population. Pawlosky says lessons from the program's design may eventually be used as a model for similar programs in the United States.

FCL scientists are also working with the National Institute of Standards and Technology (NIST) and the Centers for Disease Control and Prevention (CDC) to coordinate their assays of folate status in blood. The CDC monitors nutrition status across the country, and NIST develops assays for private technicians to use commercially in clinical labs.—By **Rosalie Marion Bliss, ARS.**

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